

Three new bisexual species of *Labronema* Thorne, 1939 (Nematoda: Qudsianematidae)

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Abstract. Three new species of the genus *Labronema* Thorne, 1939 are described on the basis of both female and male specimens. *Labronema aequatoriale* sp. n. from Ecuador is characterized by the body length on average 2.77 (female) and 2.46 (male) mm, odontostyle as long as labial width, very long cardia, long rectum, short prerectum and supplements 21–23. *Labronema singhalese* sp. n. from Sri Lanka is differentiated by 3 mm long body, odontostyle longer than labial diameter, short female and long male prerectum, long eggs and supplements 20 in number. *Labronema orientale* sp. n. from Taiwan is characterized by a body length on average 2.52 (female) and 2.65 (male) mm, lip region offset, odontostyle longer than labial width, long rectum, short prerectum and 24–27 supplements. The taxonomic positions of *Labronema* species described after 1989–90 are commented.

Keywords. Nematoda, Ecuador, Sri Lanka, Taiwan, new species

Within the family Qudsianematidae, *Labronema* Thorne, 1939 is well characterized by the double guiding ring, longitudinal or pore-like vulva, shape of the vagina, great number of very small and contiguous supplements and the short, rounded tail of sexes. As for the nominal species placed under this genus, about half a hundred in number, the picture is by far not so clear. The high per cent (about 40 %!) of species described on the basis of one sex (female) only make the orientation within the genus more difficult. Particularly in dorylaimid nematodes, descriptions of both females and males are much to be wished!

As is expressed in the title, both of the sexes of three new *Labronema* species are herewith presented. They have been collected in tropical–subtropical regions of earth, namely in Ecuador, Sri Lanka and Taiwan. They were compared with the species described before 1989–90 (29 in number) as listed and keyed by Andrassy (1991), but with those, too, that have been discovered in the two subsequent decades (11 in number).

MATERIAL AND METHODS

The nematodes were collected by Hungarian scientists. The samples were fixed *in situ* with 4%

formaldehyde solution, and then washed out in the laboratory by flotation techniques. The nematodes were picked out by hand, and fixed again with FAA. Subsequently they were processed to pure glycerine by a slow method, and finally mounted on permanent glass slides.

Measurements were taken by ocular micrometer, curved structures were measured along the curved medial line. Drawings were made with the aid of a drawing tube attachment. The nematodes discussed herein are preserved in the nematode collection of the Systematic Zoology and Ecology of ELTE University, Budapest.

Labronema aequatoriale sp. n.

(Figs. 1 A–E and 2 A–C)

Holotype female: L = 2.58 mm; a = 28; b = 4.6; c = 99; c' = 0.7; V = 44 %.

Paratype females (n = 4): L = 2.40–3.00 mm; a = 30–33; b = 4.3–5.0; c = 90–103; c' = 0.6–0.7; V = 46–49 %.

Paratype males (n = 3): L = 2.20–2.76 mm; a = 33–38; b = 3.9–4.5; c = 74–93; c' = 0.7–0.8.

General characters. Body mostly slightly bent ventrad upon fixation, moderately slender, 75–96

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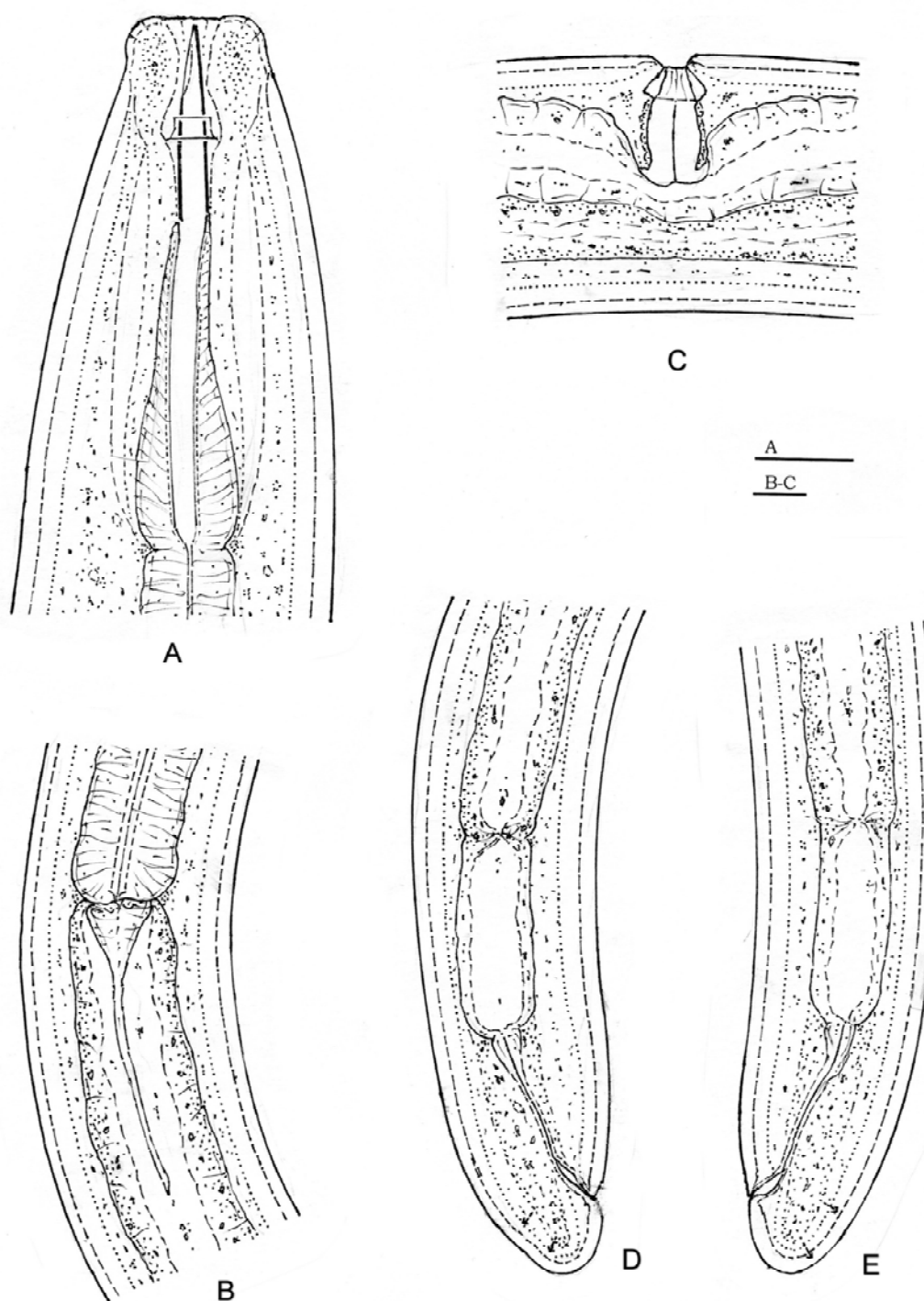


Figure 1. *Labronema aequatoriale* sp. n. A: anterior end; B: cardiac region; C: vulval region; D–E: body end of females. (Scale bars = 20 μm)

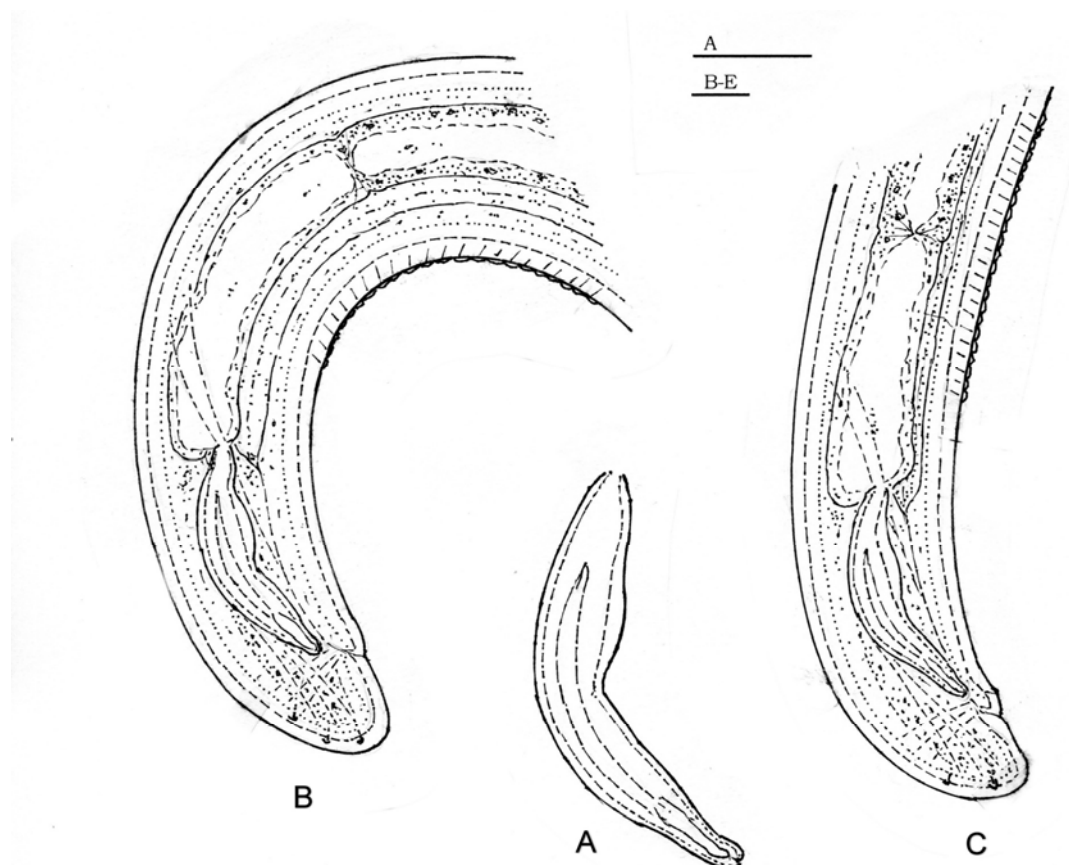


Figure 2. *Labronema aequatoriale* sp. n. A: spiculum; B–C: posterior end of males. (Scale bars = 20 µm)

(female) or 63–74 (male) µm wide at middle. Cuticle very finely transversely striated, but practically smooth under light microscope, on most body regions 5.0–5.5, on tail 7–8 µm thick (female) or 3.5–4.0 and 5–6 µm thick (male). Lip region offset by a slight depression, 22–24 µm broad; lips rounded. Body at posterior end of pharynx 3.4–4.0 (female) or 2.6–3.0 (male) times as broad as labial region. Amphids caliciform with aperture nearly half as wide as corresponding body diameter.

Odontostyle moderately developed, somewhat thicker than cuticle at the same level, 35–38 µm long, 1.2–1.5 % of body length, 1.5–1.6 times as long as labial width, and 5–6 µm thick. Aperture two-fifths of stylet length. Guiding ring double. Pharynx 550–620 µm long, at 47–50 % expanded. Dorsal nucleus at 49–52 % of pharyngeal length

or 10–12 % of total body length. AS1 invisible, AS2 = 53–56 %, PS1 = 70–72 %, PS2 = 72–75 %. Glandularium 270–310 µm long. Cardia elongate conical, unusually long, 100–120 µm.

Female. Genital system amphidelphic. Each branch 4.8–6.5 body widths long or occupying 16–21 % of body length. Vulva longitudinal with slightly sclerotized lips, vagina extending inwards 45–50 µm, about one-half of corresponding body diameter. Mature eggs not observed. Distance between posterior end of pharynx and vulva 1.1–1.2 times longer than pharynx. Vulva–anus distance equalling to 48–55 tail lengths. Rectum long, 1.6–1.9 times longer than anal body width or 2.5–2.7 times longer than tail. Prerectum 1.8–2.4 anal body widths long. Body suddenly narrowed at anal region, tail short, 25–29 µm, occupying only 1 % of body length, with bluntly rounded terminus.

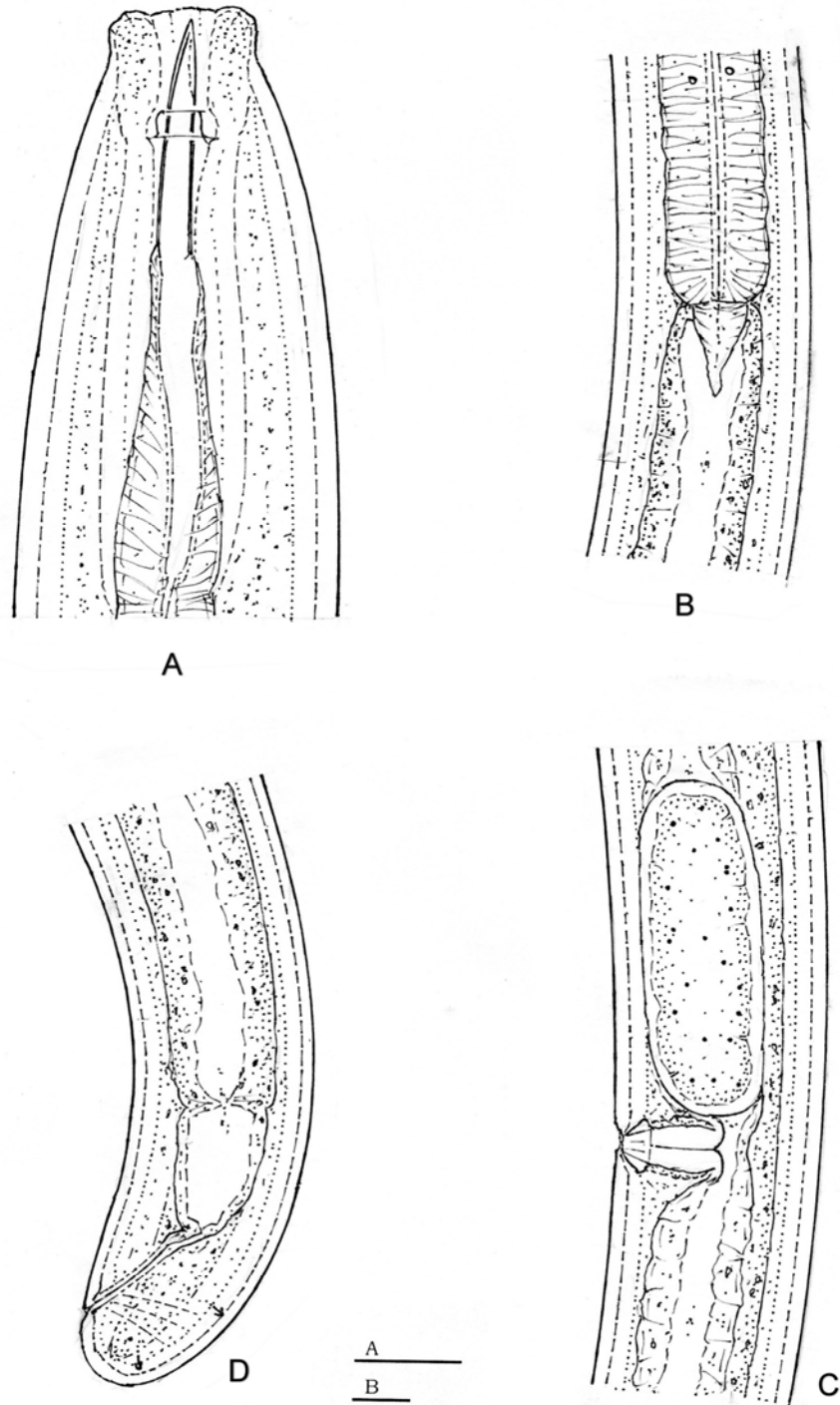


Figure 3. *Labronema singhalese* sp. n. A: anterior end; B: cardial region; C: vulval region; D: female posterior end. (Scale bars = 20 μm)

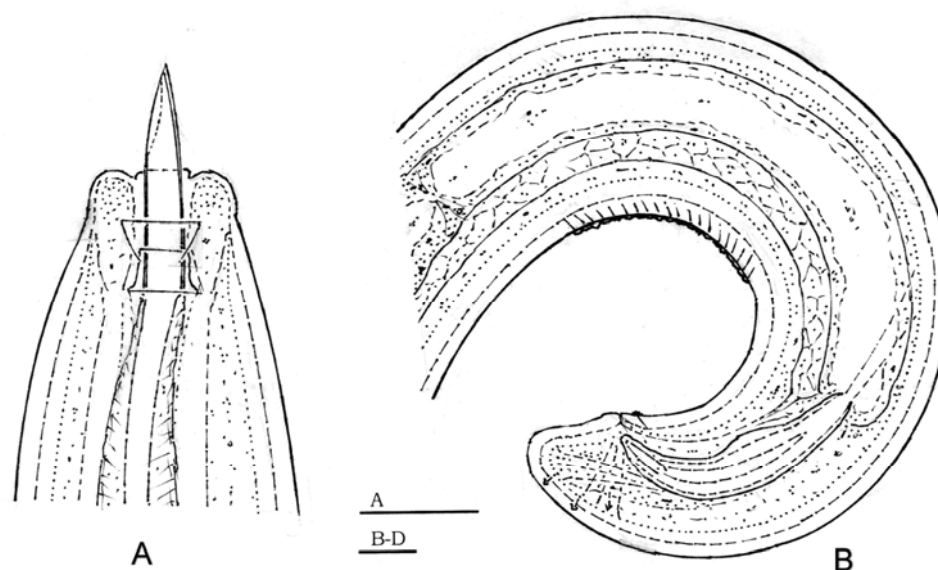


Figure 4. *Labronema singhalese* sp. n. A: anterior end of male; B: posterior end of male. (Scale bars = 20 μ m)

Male. Testes two, straight and opposed, each 3.8–4.0 body widths long or occupying 12–13 % of body length. Spermatozoa spindle-shaped. Spicula long and slender, 86–92 μ m in curvature. Ventromedial supplements 21, 22 or 23, very small and contiguous; their series extending 120–150 μ m. Prerectum beginning in the range of supplements, well behind the anteriormost one. Tail 29–30 μ m long, 1.2–1.3 % of entire length of body.

Diagnosis and relationships. Medium large and fairly robust nematodes, body on average 2.77 (female) or 2.46 (male) mm long, suddenly narrowed at anal region, lip region separated from neck, odontostyle moderately developed, cardia unusually long, vulva longitudinal and slightly sclerotized, prerectum fairly short, rectum however longer than usual, spicula long and slender, supplements numerous and very small, tail rounded, hemispherical.

The long cardia, long rectum, body shape at anal region, slender spicula and the shape of the female tail are particularly characteristic for *Labronema aequatoriale* sp. n.

As for the body length, offset head, moderately developed odontostyle and number of supplements, the new species is closely related to *Labronema goodeyi* Altherr in Altherr & Delamare Deboutteville, 1972 (body 2.3–2.9 mm; odontostyle 30 μ m, supplements 22) and *L. nemellum* Mushtaq & Ahmad, 2007 (body 2.3–2.9 mm, odontostyle 36–40 μ m, supplements 24). Nevertheless, it can be differentiated from *L. goodeyi* by the longer odontostyle (35–38 vs 30 μ m), shorter prerectum (1.8–2.4 vs 4.3–4.7 anal body widths), longer rectum (2.5–2.7 vs 1.3–1.5 tail lengths) and by the shape of the female anal region and tail; from *L. nemellum* by the much longer rectum (2.5–2.7 vs 1.2–1.3 tail lengths), shorter male prerectum (vs beginning at level with the anteriormost supplement), slender spicula and shape of the female tail (hemispherical vs conoid-rounded). *Labronema goodeyi* was described from Massachusetts, United States, and later recorded from Russia (Gagarin, 1992), while *L. nemellum* was found in India.

Type specimens. Holotype female on slide Nr. 13365. Paratypes: four females and three males. Preserved in the Department of Systematic Zoo-

logy and Ecology of the ELTE University, Budapest.

Type habitat and locality. Litter from a rain-forest, 750 m above sea level, El Palmar, Cañar Province, Ecuador; collected in April 1990 by A. Zicsi and Cs. Csuzdi.

Etymology. Named after its geographical distribution.

***Labronema singhalese* sp. n.**

(Figs. 3 A–D and 4 A–B)

Holotype female: L = 3.04 mm; a = 45; b = 5.1; c = 136; c' = 0.5; V = 49 %.

Paratype male: L = 2.86 mm; a = 40; b = 4.7; c = 98; c' = 0.7.

General characters. Body slightly (female) or strongly (male) curved ventrad, 66–70 µm wide at middle. Cuticle practically smooth, 3.5–5 µm thick on most body, and 7 µm thick on tail. Lip region separated by a shallow depression, 25 µm wide, lips rounded. Body at posterior end of pharynx 2.8–2.9 times as wide as head. Amphids caliciform with aperture about one-half of corresponding body width.

Odontostyle 40–42 µm long, 1.3–1.4 % of total body length, 1.7 times longer than labial width, strong, 6–7 µm thick, thicker than cuticle at the same level (about as thick as one-third labial diameter). Aperture occupying two-fifth to nearly one-half of stylet length. Guiding ring double. Pharynx 600–610 µm long, heavily muscular, at 48–49 % expanded. Dorsal nucleus at 50–51 % of pharyngeal length, or 10–11 % of entire length of body. Most of the other gland nuclei inconspicuous, PS2 = 70–72 %. Glandularium 296–302 µm long. Cardia conical.

Female. Reproductive system very well developed, amphidelphic. Each genital branch 9.2 body diameters long or occupying 20 % of body length. Vulva longitudinal with slightly sclerotized lips, vagina 36 µm long, extending inwards to about 50 % of the corresponding body diameter. Distance between posterior end of pharynx and vulva 1.5 times as long as pharynx. Rectum 1.2,

prerectum 1.1 anal body widths long. One mature egg: 124×40 µm, 1.8 times as long as mid-body diameter. Vulva–anus distance equalling to 68 tail lengths. Tail quite short, 22 µm, only 0.7 % of body length.

Male. Testes opposite, straight, each 6.3 body widths long or occupying 16 % of body length. Spermatozoa fusiform, small, 6–7 µm. Spicula large, 96 µm long. Ventromedial supplements very small, 20 in number; their series 70 µm long. Prerectum beginning well over the anteriormost supplement. Tail conoid-rounded, 29 µm long or 1.0 % of entire length of body.

Diagnosis and relationships. A large species, 3 mm, with comparatively slender body, slightly separated lip region, strong odontostyle more than one-half times longer than labial width, at its middle expanded pharynx, short female and long male prerectum, longitudinal vulva, well developed gonads, long egg, large spicula, very small supplements 20 in number, and broadly rounded tail in both sexes.

By virtue of the the length (about 3 mm) and slenderness of body, the moderately offset head and the large stylet opening, this new species resembles *Labronema thornei* Ferris, 1968. It can be distinguished from its relative by having a longer and thicker odontostyle (40–42 vs 30–34 µm; 1.7 vs 1.2–1.3 labial widths; thicker vs thinner than cuticle) and a shorter prerectum (1 vs 2.5–3.0 anal body widths long). The male is not comparable since this sex is unknown in *L. thornei*. Ferris found her species in Indiana, United States. Subsequently, Panesar and Marshall (2003) reported it from British Columbia, Canada, but they did not add any contribution to its morphology.

Type specimens. Holotype female on slide “Sri Lanka Nr. 6”. Paratype: one male. Deposited at the Department of Systematic Zoology and Ecology of the ELTE University, Budapest.

Type habitat and locality. Rich black humus around grass roots in a claudy bamboo forest, 1800 m above sea level, Nuwara Eliya in the central highlands of Sri Lanka; collected in June 1968 by J. Balogh and I. Loksa.

Etymology. Named after Singhalese (or Sinhalese) people, the majority ethnic group in Sri Lanka.

***Labronema orientale* sp. n.**

(Figs. 5 A–E, 6 A–B and 7)

Holotype female: L = 2.56 mm; a = 23; b = 3.8; c = 86; c' = 0.7; V = 52 %.

Paratype females (n = 3): L = 2.47–2.58 mm; a = 23–24; b = 3.6–4.2; c = 74–78; c' = 0.6–0.7; V = 48–51 %.

Paratype males (n = 5): L = 2.44–2.96 mm; a = 23–25; b = 3.8–4.2; c = 65–68; c' = 0.6–0.7.

General characters. Body slightly bent ventrad after fixation, robust, 96–126 µm wide at middle. Cuticle practically smooth, 5–7 µm thick on most regions, and 8–10 µm thick on tail. Lip region offset by a depression, 28–31 µm wide, lips rounded. Body at proximal end of pharynx 3.3–3.8 times as wide as head. Amphids caliciform with aperture about as wide as one-half corresponding body.

Odontostyle strong, 6 µm thick, thicker than cuticle at the same level, 44–48 µm long, 1.6–1.8 % of body length, 1.4–1.6 times as long as labial width. Aperture about two-fifths of stylet length. Guiding ring distinctly double. Pharynx heavily muscular, 620–690 µm long, at 48–50 % expanded. Dorsal nucleus at 51–54 % of pharyngeal length or 12–14 % of total body length. AS1 inconspicuous, AS2 = 50–54 %, PS1 = 65–68 %, PS2 = 69–70 %. Glandularium 280–320 µm long. Cardia conical.

Female. Reproductive system amphidelphic, moderately developed. Each genital branch 3.3–3.6 body widths long, or occupying 12–16 % of body length. Vulva longitudinal with sclerotized, 30–38 µm broad lips, vagina strong, 55–62 µm long, 50–60 % of the corresponding body width deep. No uterine eggs observed. Distance between

posterior end of pharynx and vulva about as long as pharynx. Vulva–anus distance equalling to 35–40 tail lengths. Rectum as long as 1.3–1.7 anal body widths or 2.5–2.8 tail lengths. Prerectum 1.2–1.6 anal body diameters long. Tail broadly rounded, 28–34 µm long, occupying 1.3 % of entire length of body.

Male. Genital system diorchic, testes opposite, rather short, each 2.5–3.0 body widths long or occupying 10–12 % of body length. Spermatozoa fusiform, slender, 7–8 µm long. Spicula long and slender, 108–120 µm in curvature. Ventromedial supplements 24–27 (24, 24, 26, 26, 27), very small and contiguous. Tail similar to that of female, 38–40 µm long, occupying 1.5 % of total length of body.

Juvenile. The tail is broadly rounded (non-digitate) in third- and fourth-stage.

Diagnosis and relationships. Body robust, on average 2.52 (female) or 2.65 (male) mm long, cuticle thick, lip region offset, odontostyle strong, one-and-a-half times longer than labial diameter, vulval lips broad and sclerotized, prerectum short, rectum long, female and male gonads rather short, spermatozoa thin, spicula long and slender, supplements numerous, tail broadly rounded.

Particularly the robust body, broad lip region (28–31 µm wide), strong odontostyle (44–48 µm long), short gonads and the long spicula are characteristic for this species.

Among the *Labronema* species of 2.5 mm body length or so, the present new species is distinctive because of its odontostyle length (44–48 µm vs 25–40 µm). As for its measurements, *Labronema orientale* sp. n. comes closest to *L. diversum* Andrásy, 2002 (2.2–2.8 mm, a = 24–25, lip region 28–30 µm wide, odontostyle 38–40 µm long, spicula 96–105 µm, supplements 23–28 in number), but it can easily be distinguished from that by the simply rounded female tail (vs digitate: rounded with a dorsally curved peg). *Labronema diversum* was described from Chile.

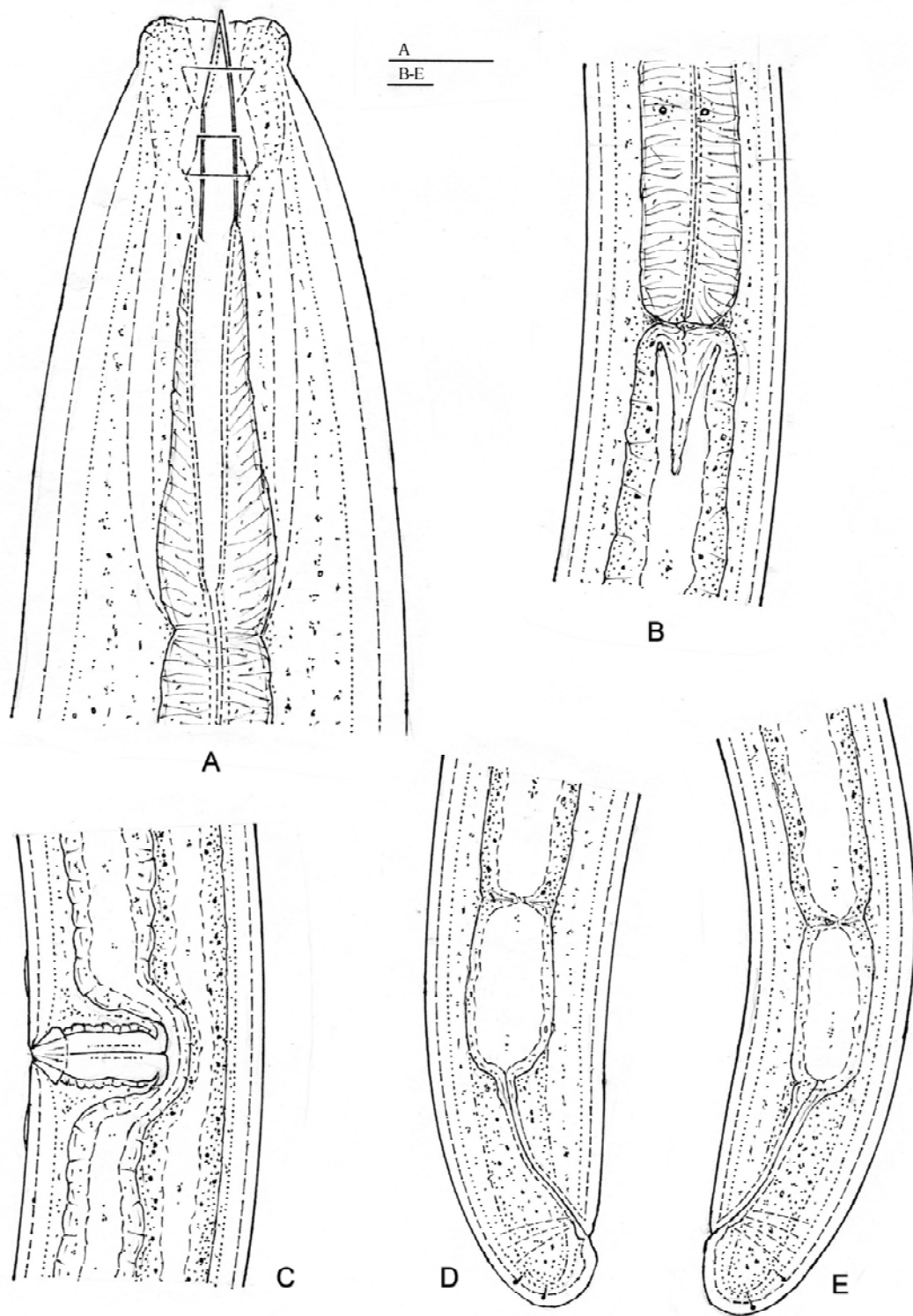


Figure 5. *Labronema orientale* sp. n. A: anterior end; B: cardiac region; C: vulval region; D–E: posterior end of females. (Scale bars = 20 µm)

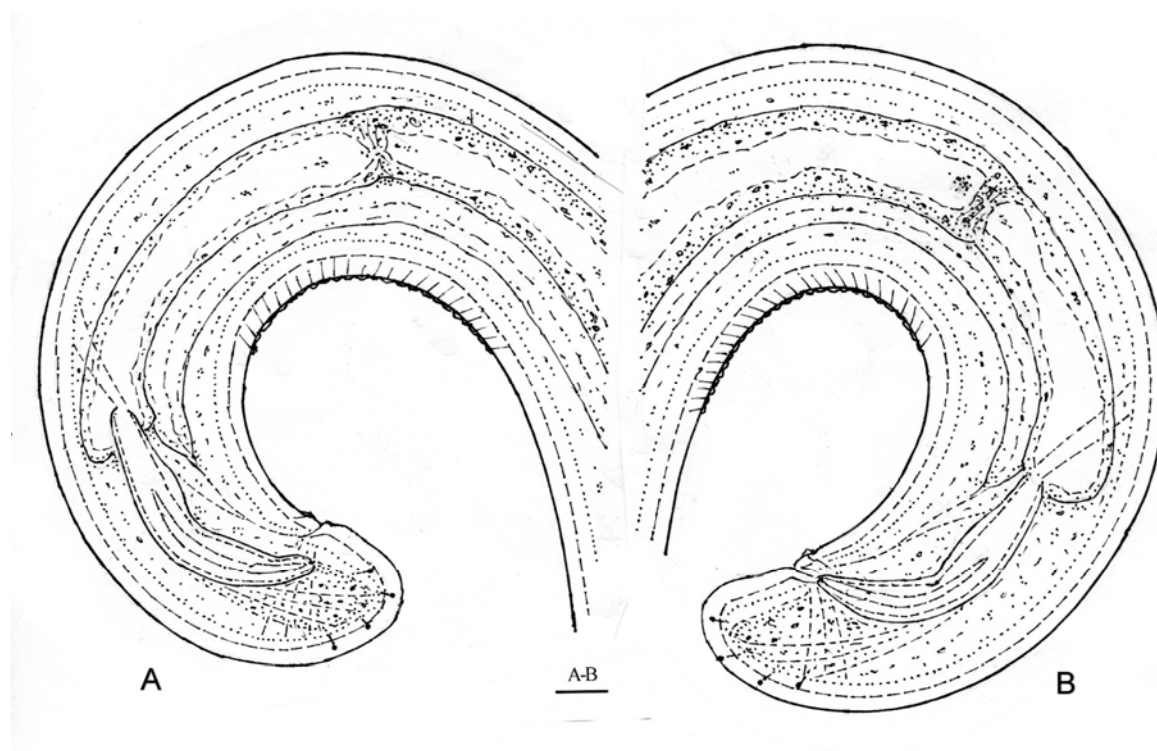


Figure 6. *Labronema orientale* sp. n. A–B: posterior end of two males. (Scale bar = 20 µm)

Type specimens. Holotype female on slide “Taiwan Nr. II/1”. Paratypes: three females, five males and four juveniles in the collection of Department of Systematic Zoology and Ecology at the ELTE University, Budapest.

Type habitat and locality. Soil from a secondary broad-leaved forest, 2100 m above sea level, NW slope of Mt. Wufanaiwe, Renai township, Nantou County, Taiwan; collected in October 2009 by L. Dányi and E. Lazányi.

Etymology. The epithet *orientale* refers to the far oriental distribution of this species.

SHORT COMMENTS ON THE NOMINAL SPECIES OF *LABRONEMA* DESCRIBED AFTER 1989-90

Out of the twenty species described under *Labronema* in the last two decades, eleven belong in all probability to this genus (*andrassyi*, *angeloi*, *brevicauda*, *carusoi*, *deoriaense*, *diversum*, *ger-*

lachi, *korandum*, *macrosoma*, *mangaloreense* and *nemellum*), but eight certainly do not (*baqrii*, *bicucitulum*, *enigmatum*, *ibarakiense*, *malagasi*, *papillatum*, *seychellense* and *sphinctum*). Is it *Labronema* or not, the taxonomic position of one species is open (*plica*).

Labronema andrassyi Gagarin, 1992. Russia. A robust species known in females only and resembling in habitus the old *L. latum* (Cobb, 1891) Andrassy, 1986, which latter is however a rather problematic taxon.

Labronema angeloi Vinciguerra & Clausi, 1994. Italy. In general, it fits the genus. Although the vulva is illustrated with large sclerotized lips (Fig. 15) as occurring in transverse vulvas, it is longitudinal or, better, pore-like as is seen in the SEM photo (Fig. 40).

Labronema baqrii Khan, Jairajpuri & Ahmad, 1989. India. A small species around 1 mm with transverse vulva, subdigitate female tail and though numerous (20–23) but spaced supplements.

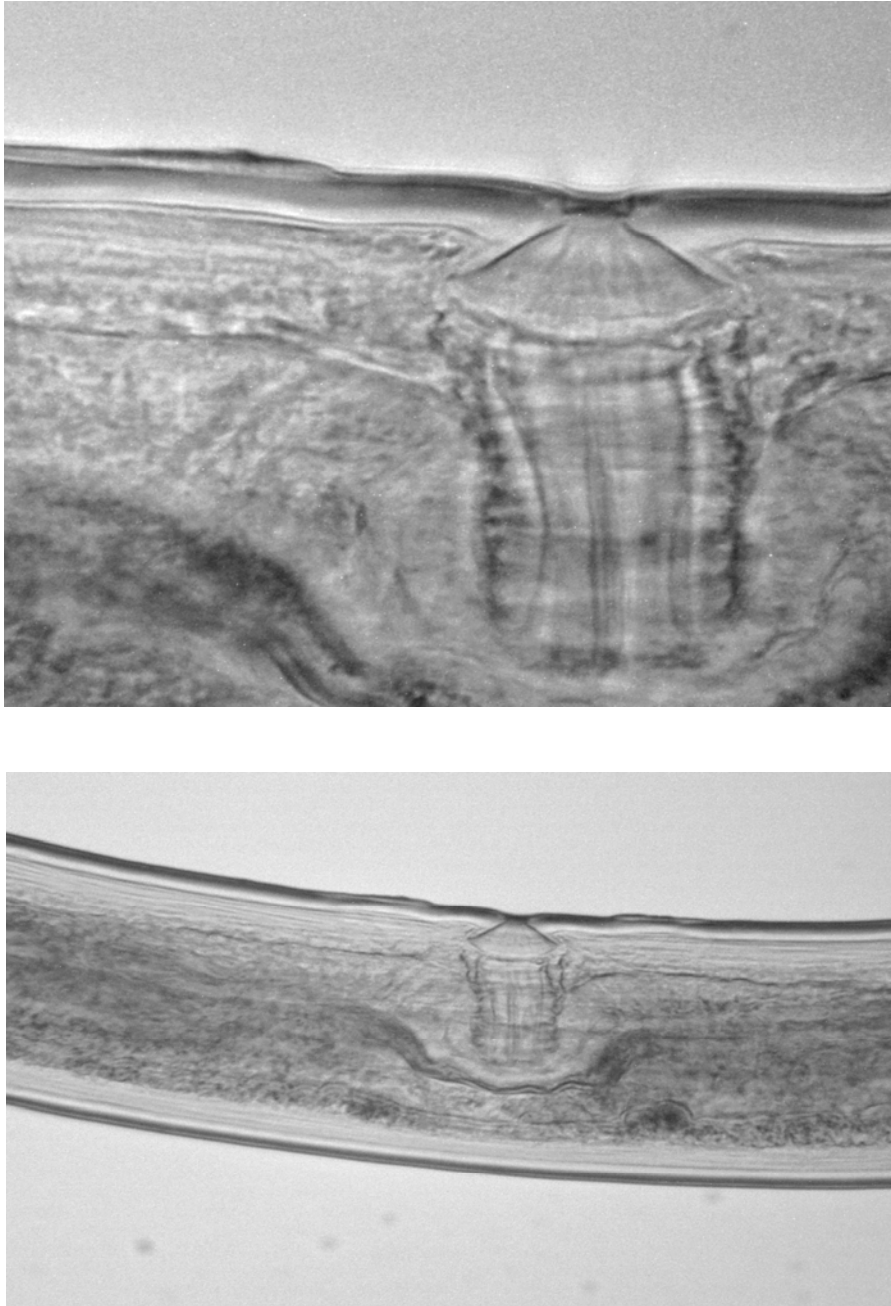


Figure 7. Vulval region of *Labronema orientale* sp. n.; a very typical vulva–vagina complex for the genus *Labronema*

It does surely not belong to *Labronema*. Is it a *Crassolabium*?

Labronema bicuticulum Furstenberg, Heyns & Swart, 1993. Seychelles. As the authors say, the double cuticle on tail distinguishes it from all known *Labronema* species. In addition, the short odontostyle and the non-typical vulva–vagina also suppose that this species better belongs to the genus *Aporcelaimellus* than *Labronema*. It is herewith transferred to the former genus: *Aporcelaimellus bicuticulus* (Furstenberg, Heyns & Swart, 1993) comb. n.

Labronema brevicauda Furstenberg, Heyns & Swart, 1993. Madagascar. A robust species with *Labronema*-like vulva–vagina and other characters typical for the genus. The male is unknown.

Labronema caruso Vinciguerra & Orselli, 1998. Italy. In spite of the fact that the illustration (Fig. 2 A) shows a non-typical vulva, this species corresponds in other morphological characters to *Labronema*.

Labronema deoriaense Khan, Jairajpuri & Ahmad, 1989. India. In having *Labronema*-like characters, this large-sized (3–4 mm) and very slender species should be accepted as a representative of this genus. Known in female only.

Labronema diversum Andrásy, 2002. Chile. Easily can be identified by the dimorphic tail: conoid-rounded in male as usual, but possessing a dorsally curved peg in female. This peculiar structure of the female tail appears to be an atavistic character which may occur in some larval stages as illustrated by Ferris (1968) in *Labronema thornei* Ferris, 1968.

Labronema enigmatum Baniyamuddin & Ahmad, 2007. India. This species was transferred by me (Andrásy, 2009) to *Labronemella*.

Labronema gerlachi Andrásy, 2011. Seychelles. A very robust monosexual species with quite short prerectum, but with typical *Labronema* characters. Only females are known.

Labronema ibarakiense Khan & Araki, 2002. Japan. Since the vulva is transverse, the tail subdigitate in both sexes and the supplements are

spaced, I propose to transfer this species to the genus *Talanema*, as *T. ibarakiense* (Khan & Araki, 2003) comb. n.

Labronema korandum Choi, Khan & Choi, 2001. Korea. I know this species only from a short abstract; its description was unfortunately not available. *Labronema*?

Labronema macrosoma Alekseev, 1992. Russia. A well characterized species, one of the largest representatives of the genus *Labronema* (5–6 mm).

Labronema malagasi Furstenberg, Heyns & Swart, 1993. Madagascar, India. Because of the transverse vulva and the few (13) and well-spaced supplements I (2009) transferred this species to *Crassolabium*.

Labronema mangaloreense Ahmad & Ahmad, 2002. India. A well characterized *Labronema* species. Its spicula (L-shaped, dorsally thickened and beak-like in distal part) are very similar to those of *L. pacificum* (Cobb, 1906) Thorne, 1939 as recently described and illustrated by Álvarez-Ortega, Vu and Peña-Santiago (2010). *Labronema mangaloreense* is however shorter, more slender and has a much shorter odontostyle.

Labronema nemellum Mushtaq & Ahmad, 2007. India. Well fits the *Labronema* pattern.

Labronema papillatum Khan, Ahmad & Jairajpuri, 1995. India. Because of the heavily sclerotized transverse vulva it was transferred by me (Andrásy, 2009) to *Crassolabium*.

Labronema plica Ciobanu, Popovici & Decraemer, 2004. Romania. In having a cap-like lip region, a short odontostyle and a simple guiding ring, Popovici *et al.* (2008) transferred this species to *Thonus*, and recently Peña-Santiago and Ciobanu (2011) to *Crassolabium* (syn. *Thonus*). The former authors noted that the shape of the vulva–vagina and the great number of the contiguous supplements better fit the *Labronema* pattern. It is possible that, by virtue of the last mentioned two structures being so characteristic for *Labronema* (e.g. see the vulval regions of the present new species), *L. plica* should still be left in its

original genus. For the present, be this question open.

Labronema seychellense Furstengberg, Heyns & Swart, 1993. Seychelles. Because of the few (10) non-contiguous supplements I (2009) transferred it to *Crassolabium*.

Labronema sphinctum Mohilal & Dhanachand, 2001. India. In having only a few (8) well spaced supplements, this species cannot be placed under *Labronema*. Its taxonomic position is uncertain.

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Table 1. Main morphometric characters of *Labronema* species described in the last two decades and the present paper

<i>Labronema</i>	L	a	b	c	c' (♀)	V	Lip reg..	Odontost	Spicula	Supplem
<i>aequatoriale</i> sp. n.	2.4-3.0 2.2-2.8	28-33 33-38	4.3-5.0 3.9-4.5	90-103 74-93	0.6-0.7	44-49	22-24	35-37	86-92	21-23
<i>andrassyi</i> Gagarin, 1992	2.1-2.7 —	19-28	4.0-4.3	55-74	0.6-0.8	51-56	21-22	37-39	—	—
<i>angeloi</i> Vinciguerra & Clausi, 1994	1.5-1.8 1.3-1.8	19-23 20-25	3.5-4.4 3.3-4.1	50-70 47-59	0.6-0.8	58-61	19-21	24-28	58-69	15-17
<i>brevicauda</i> Furstenberg <i>et al.</i> , 1993	1.6-2.1 —	22-23	3.8-4.0	64-79	0.4-0.6	50-52	21-25	32-36	—	—
<i>carusoi</i> Vinciguerra & Orselli, 1998	1.5-1.9 1.4-1.9	22-25 21-31	4.2-5.0 3.8-4.8	62-77 42-61	0.6	54-57	18-24	23-28	47-65	18-21
<i>deortense</i> Khan <i>et al.</i> , 1989	3.2-3.7 —	45-50	4.3-4.9	119-154	0.6-0.7	49-56	26-27	35-37	—	—
<i>diversum</i> Andrássy, 2002	2.2-2.8 2.6-2.8	24-25 24-26	3.4-3.7 3.1-4.5	60-72 68-72	0.7-0.8	50-53	28-30	38-40	96-105	23-28
<i>gerlachi</i> Andrássy, 2011	1.7-2.0 —	17-19	3.7-4.0	51-53	0.6	45-48	21-22	33-35	—	—
<i>korandum</i> * Choi <i>et al.</i> , 2001	2.2-2.3			68-81				27-28	61	
<i>macrosona</i> Aleksiev, 1992	5.4-5.9 4.7-4.8	26-30 26-30	5.2-6.3 4.0-6.0	85-99 91-92	0.6	44-47	32-36	59-62	125-127	28-30
<i>mangalorensis</i> Ahmad & Ahmad, 2002	1.6-1.9 1.7-2.0	30-37 29-32	4.2-4.9 4.2-4.9	76-85 65-74	0.6-0.7	51-55	15-16	21-22	49-52	16
<i>nemellum</i> Mushtaq & Ahmad, 2007	2.3-2.4 2.9	23-25 26	3.8-3.9 4.1	61-64 81	0.8	50-51	23-24	36-40	97	24
<i>orientale</i> sp. n.	2.5-2.6 2.4-3.0	23-24 23-25	3.6-4.2 3.8-4.2	74-86 65-68	0.6-0.7	48-52	28-31	44-48	108-120	24-27
<i>singhalese</i> sp. n.	3.0 2.9	45 40	5.1 4.7	136 98	0.5	49	24	40-42	96	20
Range (mostly females)	1.5-5.9	17-50	3.4-6.3	50-154	0.4-0.8	44-61	15-36	21-62	47-127	15-30

* Some measurement data are from an abstract, the original description was not available.

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